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Comparing Three Telecom Offers and PSS

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Abstract

The increasing presence of telecommunication offerings on the market poses the question of material and energy consumption. One way to reduce these impacts would be to shift their business model to Product-Service Systems (PSS). To study this prospective, the paper focuses on three telecom offerings provided by a French telecom carrier and analyses how close they are to PSS. The first is a classical telecom business offering dedicated to small and medium sized enterprises. The second is dedicated to the school market, providing a dematerialized solution to help the different actors to interact and share information. The third concerns retirement homes and medical establishments. It helps the medical staff to improve the safety of disabled persons. Evaluation of the cases highlights the key parameters that guide transition to PSS. The paper shows how the method can be used to understand each offer individually and also to establish priorities between the offers for introducing PSS.

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Keywords: PSS; PSS Transition; Telecom Service; Case Studies

1. Introduction

As awareness of sustainability issues grows, there are rising concerns on the impacts of industrial activities on the environment. A recent report from the European Environment Agency [1] stated that costs associated to the air quality have been decreasing during the past few years. Nevertheless they are still estimated between 59 to 189 billion euros and the energy consumption forms the “largest share” [1].

Energy consumption of the Information and Communication Technologies (ICT) has been growing for decades [2,3]. Even though ICT devices are becoming more and more energy-efficient, due, for example, to European environmental legislation reinforcement [4], their expansion plays a key role contributing to a global increase of energy consumption [5].

To reduce environmental impacts and insure a better quality of life, the need to disconnect product manufacturing from increasing resource and energy consumption is mandatory [6]. However it is unreasonable to hope to limit the amount of devices per capita. Thus, new consumption models have to be set up [7]. Product-Service Systems (PSS) are seen as a lever to improve sustainability and reduce environmental impacts, such as material and energy consumption [7,8]. It promotes the use of a physical product through services rather than ownership [9,10].

This study focuses on telecommunication offers. They extensively use ICT and are concerned by sustainable business models. In a previous paper, telecom offers were globally characterized for PSS [11]. In this study, we will consider three marketed telecom offers in particular. Their features are analyzed and their potential to move from current business models to PSS is evaluated. The results of each case may be used by managers to understand the key elements of current offers, to appreciate new potentials within a PSS framework and to help them in the design of new PSS telecom offerings.

The three case studies are dedicated to the Business to Business (B2B) market, where PSS seem easier to introduce [6]. The first two cases are typical telecom offers. The first is dedicated to small and medium-sized enterprises (SME), for whom products are considered as tools to provide services. This solution already seems to include some elements of a PSS offer. The second is dedicated to the school

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market. It provides a solution to help the different actors to interact and share information. The offer can be modulated to suit client needs, and can be considered dematerialized because no product is directly included in the offer. The third offer is more specific. It concerns retirement homes and medical establishments. The offer provides products and services to insure safety to disabled persons and the medical staff.

To analyse the different cases, the study uses a framework established in [11]. It is briefly recalled in Section 2. Sections 3, 4 and 5 then examine the 3 cases. A comparison of the PSS potentials of the offers is exposed in Section 6. Section 7 concludes the study.

2. Framework of the Study

To understand how telecom offers comply with PSS, they are evaluated along four axes [11]. Three of them are from "The Service Strategy Triad" of Roth and Menor [12] and a fourth axe is added to cover environmental potentials. The three first axes are: the Product-Service Concept, the Delivery System and the Target Market (Fig. 1).

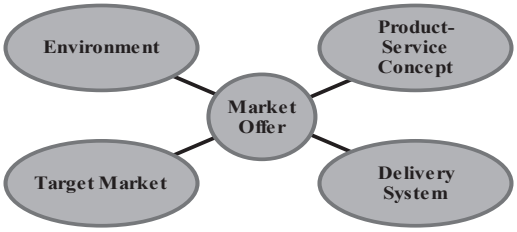

Fig. 1. Axes of the methodology

The previous paper highlighted the particularities of telecom offers [11]. They provide services based on the global telecom infrastructure, but also require additional products and need strong organization [11]. These products can be included products or supporting products, depending on whether they are provided in the offer or provided by the customer [11]. Furthermore, the products may be used either personally or mutualized between different users.

Customer relations are largely supported by hotlines and software found on the carrier websites [11]. Some of the offers are dematerialized and at least partly paid by use [11].

The principal criteria used to evaluate the offers are recalled in Table 1. A fuller explanation of the criteria and how they are used can be found in [11]. The data for each case was collected from internal and public information coming from the telecom carrier providing the offers. Evaluations by two researchers were done separately and confronted. The work was supervised by an experimented researcher working in the carrier company.

The closer each offer is to the PSS characteristic studied, the higher the score it gets. The results of the evaluation can be illustrated in ring diagrams for each axe on a 0 to 1 scale (see Fig. 2-10). For practical reasons, the third and fourth axes have been combined in the same ring. Thereby, the larger the resulting ring, the better is the PSS potential of the offer.

Table 1. Principal criteria derived from [11].

Product-Service Concept	Delivery System	Target Market	Environment
Product included	Infrastructures	Client typology	Regulations
Product in Support	Relationships - client	Owner	Lifespan
Use of product		Low Risks	Dematerialization
Telecom Service	Relationships - supply chain		Environmental improvements
Technical Service			
Informative Service	Contract		
Knowledge Management Services	Innovation		
	Modularity and Upgradability		

3. Case Study 1: Open Pro Office (Balanced Formula)

The first case study is a classic telecom offer for SME. It includes a complete set of products and services required by most SME.

3.1. Case description

Open Pro Office is designed to fulfil most SME needs in terms of telecommunications. It provides them unlimited internet access, a switchboard, a fax line, the possibility to have up to twenty landlines, four mobile lines and many services, according to client needs.

Open Pro Office includes at least one modem and may provide other products, such as phones and a telephone switchboard. All these products are used by different employees without discrepancy. The offer requires supporting products (computers, phones, mobiles…) to take full advantage of the offer and the different services. Indeed, the telecom carrier provides a variety of services, such as telecom (internet access, telecommunication data, fax line…), technical (on-site installation, maintenance operation …) and informative (training, phone and web-assistance …) services. The telecom carrier also insures reestablishment of the main services within 8 hours in case of problems.

The modem is the key element of the proposal. It is the interface between the SME and the external virtual world. Therefore, development of this product requires a close partnership between the telecom carrier and the supply chain, at least during the manufacturing and the recycling phases of the product life. Furthermore, the offer is modular and can be adapted to client needs as many of the products and services are optional.

The target market is well-defined because the telecom carrier specifically aims SME structures. In particular contexts, such as the health sector, the offer provides specific adapted services. Finally, because Open Pro Office is only one of a range of offers, the customer may choose between many other offers depending on his needs (internet access, fax line, mobile lines, TV channels and their associated products…).

3.2. Evaluation

The results of the evaluation of Open Pro Office are depicted in ring diagrams (Fig. 2-4).

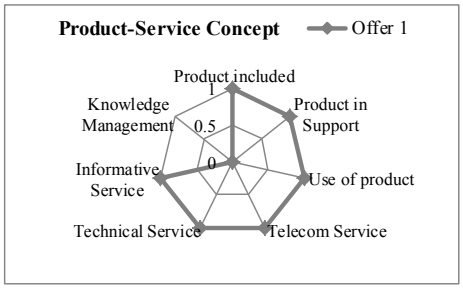

Fig. 2. The Product-Service Concept for Offer 1

First of all, the study shows that most of the core-elements found in the Product-Service Concept are included in this offer (Fig. 2). Open Pro Office includes physical products, which are shared between different users, and many services adapted to client needs.

Nevertheless, it includes products that can be considered by the users as personal objects, such as personal phones, which may hinder transition to PSS. In addition, some products may be sold to the clients, such as phones or mobiles, so that the telecom carrier does not need to manage them completely. This is in contradiction with PSS principals. Finally, despite the panoply of services provided, the telecom carrier does not intervene in client activities, which pulls him away from knowledge management services.

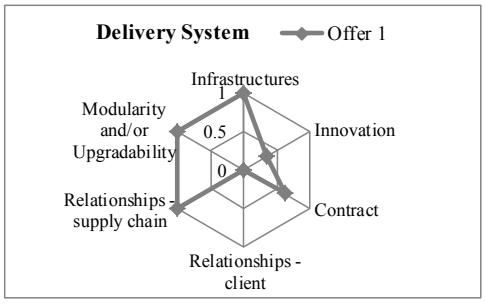

Fig. 3. The Delivery System for Offer 1

Next, the study shows in Fig. 3 that, like the majority of the telecom offers, this offer needs the support of the telecom network. One particular feature is that the offer is modular and the client may choose what he needs between different elements. In addition, the contract between the client and the telecom carrier is in favor of PSS because it includes a mid-term contract (at least two years), paid by use, and a performance warrantee for the client.

However, relations between the clients and the telecom carrier are weak. They neither interact with each other closely nor frequently, from the initialization of the offer to the end of the contract. Furthermore, the offer does not appear to be innovative, which would not impulse business model transition.

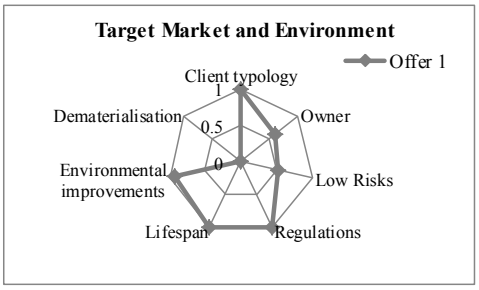

Fig. 4. The Target Market and Environment for Offer 1

In Fig. 4, the clients targeted by the offer are well-identified. The study also highlights that the telecom carrier rents the modem. Retaining the ownership of products is a key for PSS because the provider can manage them all along their lifecycle. Nevertheless, this is countered by other included products, such as phones or mobiles, are often sold to the client.

Moving on to the potential risks involved in a transition to PSS, the study shows that although risks are not really high, certain points need to be considered carefully, such as the use of personal products, the lack of close relationships with customers or the delivery strategy of the offer.

Finally, the study shows that PSS may improve product lifespans as well as environmental impacts of the whole offer (Fig. 4).

4. Case Study 2: Virtual School Workspace

The second telecom proposal studied in this paper provides Virtual School Workspace for schools. This is a complete solution, easy to implement in schools without altering former practice.

4.1. Case description

Virtual School Workspace is an innovative solution for teachers and pupils, and also for educational teams and parents. It allows participants to interact, share information and data, follow pupil activities, reserve available school resources and support collaborative work. The offer contains different modules, depending on client needs.

The solution is dematerialized and does not include any product at all, because it is hosted in the telecom carrier's servers. Even so, the Virtual School Workspace uses some supporting products to run the offer, such as computers or data projectors, which have to be connected to Internet. Thus, services drive this offer. Virtual School Workspace provides storage and sharing of data online and facilitates communication between the school team, the pupils and their parents. A service also installs the offer on-site. Maintenance and updating services are provided for better use. In addition, the telecom carrier provides advice and training to the users for better integration and use. Finally, as the offer helps the teacher in his work (services like the numeric content section, the document library, school life, a forum…) and helps communication between the different actors (email, textbook, e-agenda, rec-

ords…), the study considers that this particular telecom proposal provides knowledge management services. All these services are modular options of the offer.

The telecom infrastructures have to support the Virtual School Workspace offer. Indeed, telecom network and servers are required to operate the offer and store data for the clients. As mentioned above, the offer needs to be installed on-site and different interactions with them, through training and maintenance sessions, are also needed. This strengthens the relationships between the telecom carrier and his clients. In addition, the contract between the actors is flexible and is based either on client specifications or on a yearly basis depending on the different options chosen.

Finally, even if this offer targets the school market, it is addressed to decision-makers. They include French regional authorities and city authorities in cities with five- to a hundred-thousand people, whom are in charge of providing different educational tools. The final point is that Digital Workplace needs to take into account legislative concerns. Indeed, the telecom carrier needs to manage personal data as the offer concerns the educational field. Therefore, it requires specific security conditions, interoperability and Quality-of-Service.

4.2. Evaluation

The study evaluates Virtual School Workspace according to the four axes of the methodology. The results of the evaluation are depicted in ring diagrams (Fig. 5-7).

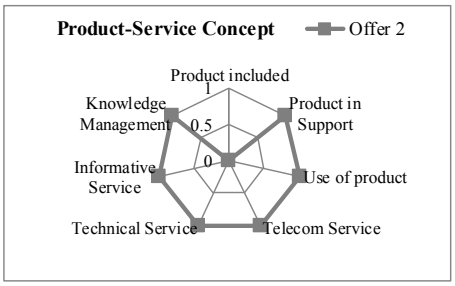

Fig. 5. The Product-Service Concept for Offer 2

In Fig. 5, the study highlights that most criteria of the Product-Service Concept are already close to PSS characteristics. The multiple services available and the current utilisation of products are criteria which facilitate transition to PSS.

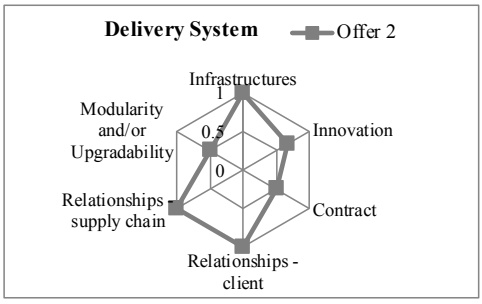

Fig. 6. The Delivery System for Offer 2

Fig. 6 shows the different features of the Delivery System and how close they are to a PSS model. Virtual School Workspace already reposes on a strong organization, capable of handling a PSS offer. Furthermore, the current contract between the actors seems to be easy to adapt to PSS because clients already pay by use. Here, the innovative potential is quite high and may encourage moving to PSS.

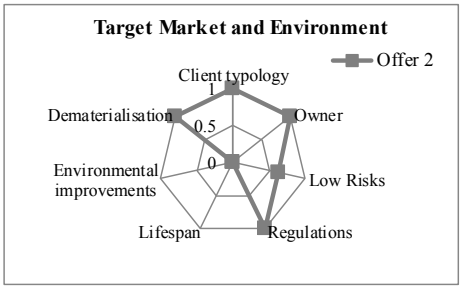

Fig. 7. The Target Market and Environment for Offer 2

The Target Market and Environmental issues are displayed in Fig. 7. As there is no product in this second offer, the study attributes the maximal grade to the ownership criterion. Thus, this offer is considered as dematerialized. In addition, and because they are partly related to the included products criterion, the risks to move to a PSS scheme are evaluated to be reasonably low; around 37% of risks.

5. Case Study 3: Senior Residency Solution

The third telecom proposal helps medico-social establishments to insure the safety of disabled persons and medical staff. It is dedicated to private and public sectors.

5.1. Case description

Senior Residency Solution is a full-custom offer. The client may choose between four independent sensor modules, according to his needs. Three modules provide alerts from the disabled patients. One alerts run-away, the second one is a portable alert button and the third one is a safety call-button for the patient, fixed in his room. The fourth module is a portable safety call-button for the medical staffs.

Each module comprises specific products and multiple services. The first module is provided with a bracelet. When the person wearing it leaves an authorized area, an alert is sent to the staff. The second module includes a necklace or a bracelet. If the disabled persons face a problem, he may send an alert to the medical team through the system. The third module includes a call unit. The disabled person may call the medical staff and speak with them through the system. The fourth module equips a staff member with a Personal Protective Equipment to alert the rest of the team when needed. Each product is dedicated to one particular person and each alert transmits the identity and the location of the person to the staff so as to optimize the reactivity of interventions. To deploy Senior Residency Solution, the telecom carrier installs on-site radio beacons to relay the alerts to the reception items.

The offer may be adapted to current on-site equipment: alerts are sent to a switchboard and there is no need to install a special one; the on-site computer can be used to set up different parameters and keep a record of alerts. The different equipment may be sold or rented to the client, according to his needs. To set up the solution, the telecom carrier calls on an expert installer service.

Training sessions, on-site interventions, maintenance services and flexible solution design are services included in the offer. Through these services a close relationship between the client and the telecom carrier can be initiated.

5.2. Evaluation

The results of the evaluation of Senior Residency Solution are depicted in ring diagrams (Fig. 8-10).

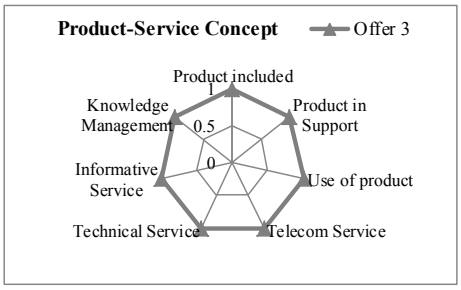

Fig. 8 The Product-Service Concept for Offer 3

In the Product-Service Concept, Fig. 8 shows that the offer encompasses all the elements found in the literature. The offer includes shared products and personal products. Here, personal products are used all the time and no intensification-in-use seems possible. The telecom carrier provides different kinds of services that include knowledge management. The offer is a powerful tool to help medical staff during their work. These criteria comply with PSS.

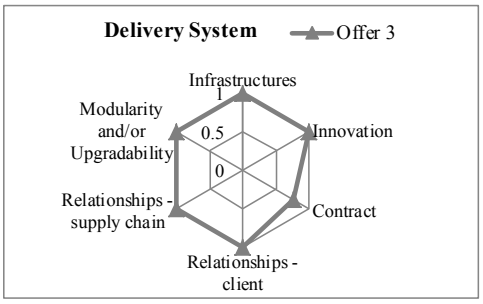

Fig. 9. The Delivery System for Offer 3

The second axe is the delivery system. All the criteria evaluated in this category match with PSS characteristics (see Fig. 9). Indeed, the telecom infrastructures play a key role. The offer is innovative by the products, services and market. The telecom carrier has close relationships with both his supply chain and clients. Senior Residency Solution is also fully modular in order to adapt to client needs and the contract is oriented long-term (three extendable years).

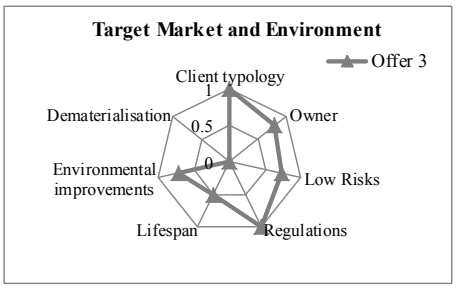

Fig. 10. The Target Market and Environment for Offer 3

Concerning the last two axes, Fig. 10 shows that the offer matches PSS characteristics especially for the target market. Client typology is well-defined. The telecom carrier keeps the ownership of most of the products and can manage them during their full lifecycle. Nevertheless, if a client wants to buy a product instead of renting it, it is possible. This point, although it allows flexibility, could hinder effective application of PSS. Nevertheless the risks encountered in moving to PSS are estimated to be low. Concerning environmental issues, the study is more reserved. Indeed, the global results tend to show that the offer may already be considered as a PSS for many reasons. However, environmental improvement would still be significant because a PSS would optimize the use of products and facilitate recuperation and reuse of products elsewhere.

6. Comparisons

6.1. Context

Open Pro Office is a typical telecom offering specially adapted for the needs of a SME. The offer organises a local telephone network for the client. It provides the necessary equipment and subscription for the SME to organise the telephone system. The products and services are typical telecom products and services. The offer is destined for professionals. Compared to other market offers there is little innovation other than the specificity of SME.

Virtual School Workspace is different in the sense that, here, the offer does not need to provide telecom equipment, with the exception of the application servers and servers for data storage, hosted by the telecom carrier. The client normally will already have computers and internet connexion and that is about all that is necessary. The offer is already dematerialised.

Senior Residency Solution is somewhat similar to the first offer in that a modular solution is proposed using various products and services in a local telecom network. The main distinction is the local network that is installed and the type of equipment used. Here the system uses modern Machine-to-Machine (M2M) communication technology [13] and is still, today, highly innovative. Many of the products used are worn or carried by the users, and though the residency staff is professional, the patients are far off from professional users.

6.2. Product-Service Concept

A comparison of the evaluations of the Product-Service Concept reveals that the third case displays all the characteristics of PSS and is therefore a natural candidate for this kind of model. Open Pro Office has good potentials but knowledge management services should be developed to enhance the PSS potential. In Virtual School Workspace there are no products included in the offer and seeing that the equipment used on-site is equipment that the client already uses for other applications, there seem little interest in moving to PSS.

6.3. Delivery System

Here too the Senior Residency Solution shows all the characteristics for PSS. Virtual School Workspace lacks a bit of modularity and upgradability, although this is partly due to the absence of included products. Open Pro Office should be more innovative and contracts should evolve towards more payment by use or result. Client relations should be pushed further for PSS.

6.4. Target Market

Comparing the results for the Target Market shows that the last two offers have better potentials while Open Pro Office shows a little more risks in PSS. Ownership problems are not present in the second offer, but that is directly linked to the absence of included products. The study reveals that ownership in the other two offers is nuanced. In Open Pro Office there could be problems because telephones can be considered as personal objects by the employees whereas in Senior Residency Solution the products worn by the patients pose particular issues that have to be accounted for.

6.5. Environment

Environmental potentials, which are one of the main drivers for PSS, show more contrasting results. Regulations have to be accounted for in all three offers. Virtual School Workspace is different from the others because it is already dematerialized and so there are not many more environmental gains to be expected with PSS. In the other two offers, the closer ties with the customer already produce better performance for Senior Residency Solution with the current business model so that PSS do not appear so much as a better solution. However this is only relative and the evaluation shows that improvements with PSS are possible and desirable.

6.6. Priorities

The study clearly shows that Senior Residency Solution is the easiest offer to turn to PSS. Open Pro Office is interesting as should evolve with PSS, while Virtual School Workspace is dematerialized and PSS is therefore not a priority.

7. Conclusion

This study evaluates three different telecom offers and exposes their PSS potentials using a framework of evaluation developed elsewhere. It highlights the key parameters that guide the transition to PSS. It becomes easier to understand each offer and the necessary improvements to reduce environmental burdens by moving to PSS. The study highlights the strengths and weaknesses of each offer in a PSS perspective. It can therefore be used by the telecom carrier to orientate decisions to switch in the future to a PSS business model.

The paper shows that the evaluation can be used to understand each offer individually, but also can be used to compare their PSS potentials.

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